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Why prompt CXL treatment vital in keratoconus diagnosis

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Take-Home

Children and adolescents with keratoconus may have rapid progression between the ages of 8 and 19 years and immediate treatment with corneal crosslinking may stop that progression.

By Lynda Charters; Reviewed by Farhad Hafezi, MD, PhD

Geneva, Switzerland—Ophthalmologists have struggled with decisions about whether to treat subpopulations of patients with keratoconus differently from the currently accepted approach.

The answer may be "yes," based on a study that found that the vast majority of children and adolescents aged 8 to 19 years have rapid keratoconic progression after the initial diagnosis is established. To avoid this, immediate treatment may be required.

When corneal crosslinking (CXL) technology was first introduced, clinicians approached its use conservatively.

"When CXL initially began to be used, we always determined that the patient was progressing before CXL was applied to be sure that an emerging technology was used carefully to avoid unnecessary complications," said Farhad Hafezi, MD, PhD, who was part of the Swiss team that developed the first CXL device.

"However, it is now time to re-visit this strategy considering that CXL is used clinically in more than 100 countries worldwide," said Dr. Hafezi, professor and chairman, Department of Ophthalmology, Geneva University Hospital, Geneva, Switzerland, and clinical professor of ophthalmology, Doheny Eye Institute, University of Southern California, Los Angeles.

Progression was defined as an increase of more than 1 D of Kmax of the anterior corneal curvature within a 12-month period.

Keratoconus can progress extremely rapidly in young patients and reported a 4-diopter progression

in a 15-year-old boy over a period of 12 weeks, he noted.

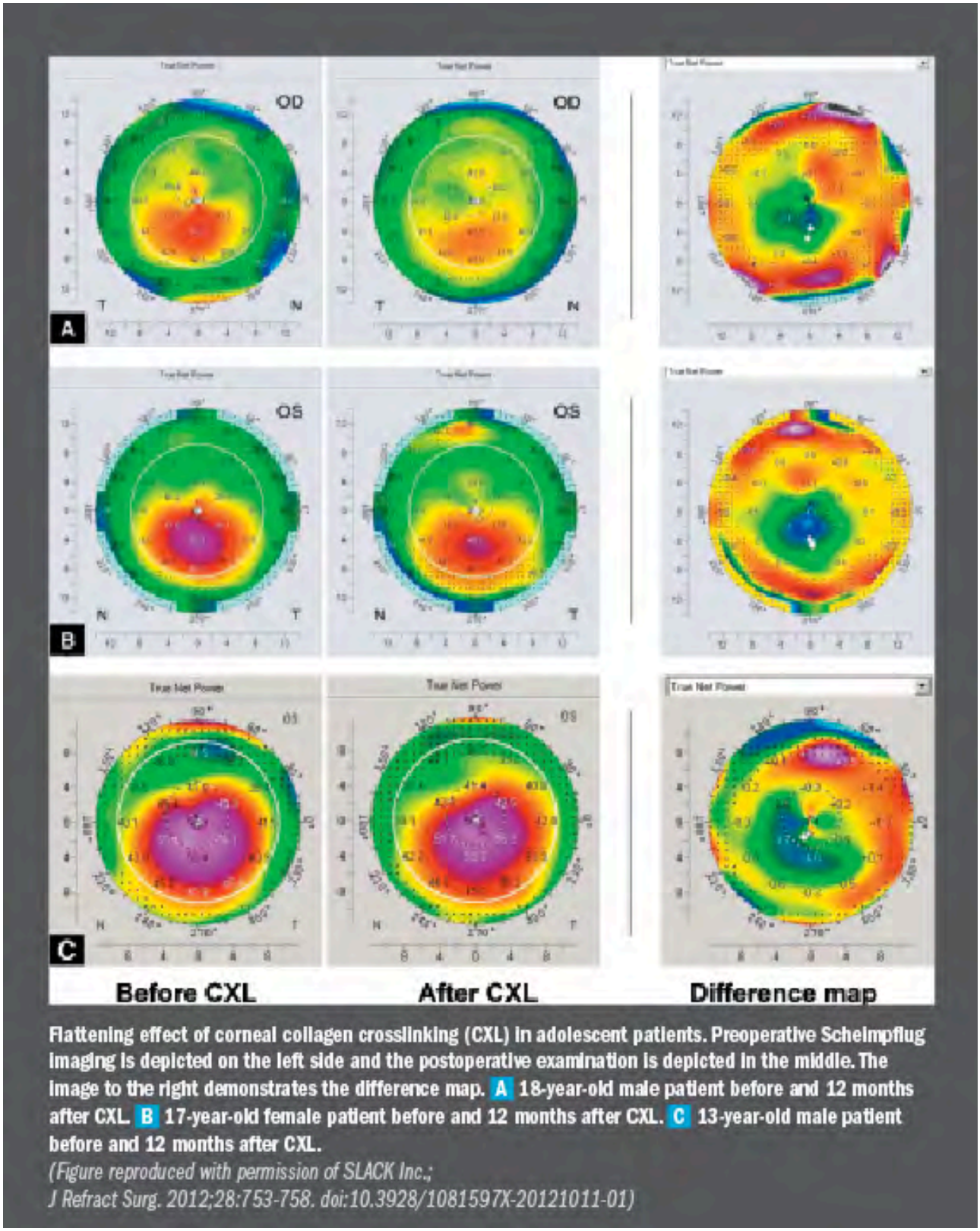
"If we wait for progression over a very short interval, it might still be too long to wait," he emphasized. He noted that he re-examines his young patients after only 4 weeks to avoid missing any immediate progression.

To address the question about adjusting treatment strategies for these children, Dr. Hafezi and his colleagues conducted a retrospective interventional cohort study of 42 patients, 36 boys and 16 girls (average age, 16.6 years; range, 9 to 19 years). Of 59 eyes examined, 52 eyes showed keratoconus progression and were included.

Informed consent from parents was received. Forty-six eyes underwent treatment after the patients provided informed consent. The patients had been followed for up to 3 years (mean, 26.3 months; range, 3 to 36 months).

"Interestingly, we found that when we looked at the arrested progression and the flattening effect of treatment, the children and adolescents behaved similarly to what we expect to see in adults," he said. "In some cases, the children and adolescents reacted faster and we observed arrested progression in as soon as 3 months after treatment compared to at least 6 months in adults."

Two



Flattening effect of corneal collagen crosslinking (CXL) in adolescent patients. Preoperative Scheimpflug imaging is depicted on the left side and the postoperative examination is depicted in the middle. The image to the right demonstrates the difference map. A 18-year-old male patient before and 12 months after CXL. B 17-year-old female patient before and 12 months after CXL. C 13-year-old male patient before and 12 months after CXL.

(Figure reproduced with permission of SLACK Inc.; J Refract Surg. 2012;28:753-758. doi:10.3928/1081597X-20121011-01)

different findings

Two other findings in this study differed from those in adults, Dr. Hafezi noted.

During the first 2 years of follow-up, Dr. Hafezi and colleagues found that children and adolescents behaved like adults, with more than 1-D flattening of the Kmax readings. However, during the third year of follow-up, there was no additional flattening and the eyes stabilized.

When these results were compared with two other studies on the same topic, one study by Paolo Vinciguerra, MD, et al. (*Am J Ophthalmol.* 2012;154:520-526) showed the same results for the first 2 years of follow-up (no data were provided on the third year of follow-up) in a larger number of patients. However, a second study by Aldo Caporossi, MD, et al. (*Cornea.* 2012;35:233-235) found that there was significant flattening during the first 2 years and additional flattening during the third year.

"The results of these studies indicated that we must pay particular attention to children with keratoconus after year 2," Dr. Hafezi said. "It seems sensible that during a period in their lives when they are susceptible to aggressive progression, cross-linking might not be the cure forever, but might be effective for a time, that is, perhaps limited to 2, 3, or 4 years. This requires closer study."

The second result that he found interesting involved the number of eyes of patients who initially presented with keratoconus between the ages of 8 and 19 years and showed keratoconic progression.

"Of the 59 eye that were diagnosed with keratoconus at the initial visit, 52 (88%) showed progression," he said. "About nine of 10 children will progress between ages 8 and 19 once keratoconus has been diagnosed."

CXL seems to be efficient in pediatric and adolescent patients, Dr. Hafezi said.

However, the long-lasting effect of the flattening is controversial and particular attention must be paid to year 3 after treatment. If almost 90% of children and adolescents have progression of keratoconus, treatment should be addressed immediately when the diagnosis is made.

"Once the diagnosis is made, this age group should be treated without waiting for progression," said Dr. Hafezi, noting this attitude was adopted as a general recommendation at the 9th International CXL Congress in Dublin, Ireland, in December 2013.

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Dr. Hafezi has no financial interest in this subject matter.

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